2020-03

CHARACTERISTICS OF ATTRITION AMONG NAVY ACQUISITION EMPLOYEES AND THE SIGNIFICANCE OF EMPLOYEE SATISFACTION RESPONSES

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THESIS

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by

John W. McCauley

March 2020

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** March 2020	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE CHARACTERISTICS OF ATTRITION AMONG NAVY ACQUISITION EMPLOYEES AND THE SIGNIFICANCE OF EMPLOYEE SATISFACTION RESPONSES	**5. FUNDING NUMBERS**
6. AUTHOR(S) John W. McCauley	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

This study examined government civilian employee attrition, primarily with Navy acquisitions personnel, and attempted to find trends that contribute to resignation turnover. Civilian attrition within the Department of Defense is an issue that can severely hinder our mission readiness. Due to some of their contractual limitations, it is much harder to replace their billets than it is with active duty personnel. It is important that we retain highly skilled and qualified employees so that we can fulfill the nation's needs. The data sources that were used during this study came from the Department of the Navy's Director, Acquisition Career Management and the Department of the Army's Person-Event Data Environment. The research was able to determine that employees who are older, have more time in federal service, and have higher levels of education, are less likely to resign from their jobs. It was also able to conclude by examining the results of employee satisfaction surveys and command resignation rates that job stress, commute strain, organizational justice, and work family conflict, seem to have the most significance for predicting resignation turnover.

14. SUBJECT TERMS civilian, acquisition, attrition, Employee Satisfaction Survey, turnover, demographics	**15. NUMBER OF PAGES** 55
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89) Prescribed by ANSI Std. 239-18

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MASTER OF SCIENCE IN MANAGEMENT

from the

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This study examined government civilian employee attrition, primarily with Navy acquisitions personnel, and attempted to find trends that contribute to resignation turnover. Civilian attrition within the Department of Defense is an issue that can severely hinder our mission readiness. Due to some of their contractual limitations, it is much harder to replace their billets than it is with active duty personnel. It is important that we retain highly skilled and qualified employees so that we can fulfill the nation's needs. The data sources that were used during this study came from the Department of the Navy's Director, Acquisition Career Management and the Department of the Army's Person-Event Data Environment. The research was able to determine that employees who are older, have more time in federal service, and have higher levels of education, are less likely to resign from their jobs. It was also able to conclude by examining the results of employee satisfaction surveys and command resignation rates that job stress, commute strain, organizational justice, and work family conflict, seem to have the most significance for predicting resignation turnover.

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LIST OF ACRONYMS AND ABBREVIATIONS

AWF	Acquisition Workforce
DACM	Director, Acquisition Career Management
DAWI	Defense Acquisition Workforce Improvement Act
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DoN	Department of the Navy
FY	Fiscal Year
GS	General Schedule
NPS	Naval Postgraduate School
PDE	Person-Event Data Environment
SECNAV	Secretary of the Navy
STEM	Science, Technology, Engineering, and Mathematics

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ACKNOWLEDGMENTS

I would like to personally thank my advisors, Dr. Spencer Brien and Dr. Jennifer Heissel, for their guidance and assistance during the creation of this thesis. I would also like to thank my loving wife, Courtney McCauley, for all of her support during my time at Naval Postgraduate School.

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I. INTRODUCTION

At a time when our nation's debt is higher than it's ever been, it is imperative that the Department of Defense (DoD) perform as efficiently as possible with every dollar spent. The U.S. government annually spends hundreds of billions of dollars on national defense; although this is a tremendous amount of money, every cent of that is needed to ensure that the United States remains the world's strongest military power. The DoD Acquisition Workforce (AWF) oversees the utilization and spending of large amounts of this budget. These General Schedule (GS) employees are responsible for the "development, acquisition and sustainment of warfighting capabilities, systems and services" (Secretary of the Navy [SECNAV], 2019, p. 1). In keeping with the Defense Acquisition Workforce Improvement Act (DAWIA) of 1990, the AWF is made up of highly skilled and qualified federal employees. For example, most of the Department of the Navy's acquisition employees are a GS-13, which is two below the max rank for the General Schedule system; their military counterparts are usually an O-4 ([SECNAV], 2019). These are relatively senior positions that require a great deal of training and responsibility.

However, due to contractual differences between military and civilian personnel, civilian employees can be much harder to maintain and replace. Civilians can decide to terminate from a position whenever they choose, regardless of whether there is a scheduled replacement or not. Acquisition employees also have incredibly valuable skills that can easily transfer to high paying, private sector positions. The very jobs and contracts that the AWF oversees provides the expert experience needed for the lucrative civilian market. For this exact reason, it is critical that the DoD does its absolute best to retain the talent it already has. Hiring new employees within the GS system is incredibly difficult as well. There is a great deal of litigation that goes along with the process that keeps it from being quick and timely. This same process makes it equally difficult to fire or terminate undesirable employees. That is why it's so important to acquire and retain qualified workers the first time around. If the AWF is experiencing high attrition rates, the entire acquisition process can sometimes come to a screeching halt. This is not only a waste of millions—and sometimes billions—of taxpayer dollars but in some instances, it can cost

the lives of U.S. military members. It is always of the utmost importance that we get safe, reliable, and superior equipment to our fighting forces as fast as humanly possible. Therefore, every action possible must be taken to mitigate civilian acquisition attrition and ensure that the AWF always employs the best and brightest people.

The purpose of this research is to develop a better understanding of attrition within the AWF. If we can observe certain trends and reasons for attrition, we will then be able to offer advice with how best to deal with it. This research will not only analyze the characteristics and trends of the U.S. Navy's AWF's attrition but will also compare it with the results of employee satisfaction surveys. Many studies address civilian employee attrition, the AWF, employee behavior and job satisfaction; however, few analyze the effect that employee satisfaction survey results have on attrition.

Research Objectives:

1. *Estimate the relationships between individual employee voluntary resignation behavior and the economic and demographic characteristics of the civilian acquisitions' workforce.*

2. *After controlling for economic and demographic characteristics, estimate the relationships between voluntary resignation and organizational characteristics, including elements of employee satisfaction.*

B. RELATED AWF RESEARCH

Several RAND National Research Defense Institute studies examine the AWF and its components. *The Defense Acquisition Workforce: An Analysis of Personal Trends Relevant to Policy, 1996–2006* is the first of three RAND studies referenced during this research. Figure 1 captures the total number of the civilian acquisition workforce employees broken down by service in 2006, with the Navy having the second highest number of employees.

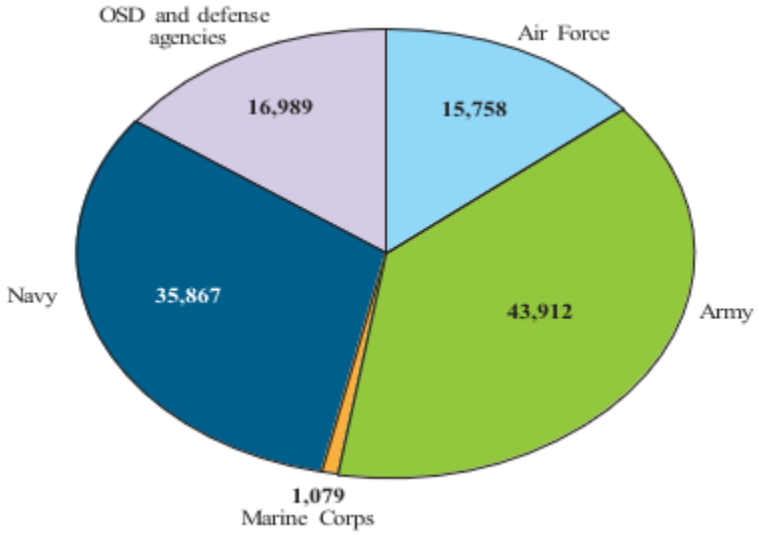

Figure 1. AW Civilian Inventory, by Service or Agency, 2006. Source: Gates (2008).

One of the important findings from this research was that AWF civilians have lower attrition rates when compared to other DoD civilians (Gates et al., 2008). They are also, for the most part, higher educated, older, and seemingly more connected to their jobs (Gates et al., 2008). From 1996–2006, there was no inclination that the AWF had any dire or irregular attrition problems. Other than the fact that a more senior workforce meant that retirements could be more prevalent, the AWF in 2006 did not have egregious issues (Gates et al., 2008).

The RAND Institute continued its research of the AWF with the publication of the *Analysis of the Department of Defense Acquisition Workforce: Update to Methods and Results through FY 2011*. From 2006 to 2011, the Navy overtook the Army with having the most AWF civilians, making up 34 percent of the total number (Gates et al., 2013). There was also a substantial increase in the AWF during this time. At the end of 2011, the civilian AWF had grown to 136,066 employees; this was an increase of almost 25,000 since 2008 (Gates et al., 2013). In both the civilian AWF and regular civilian workforce, overall attrition rates decreased after the Great Recession of 2008. Also, from 1993–2011, the AWF continued to have lower attrition levels than other DoD civilian groups. Both statistics are demonstrated in the following figures.

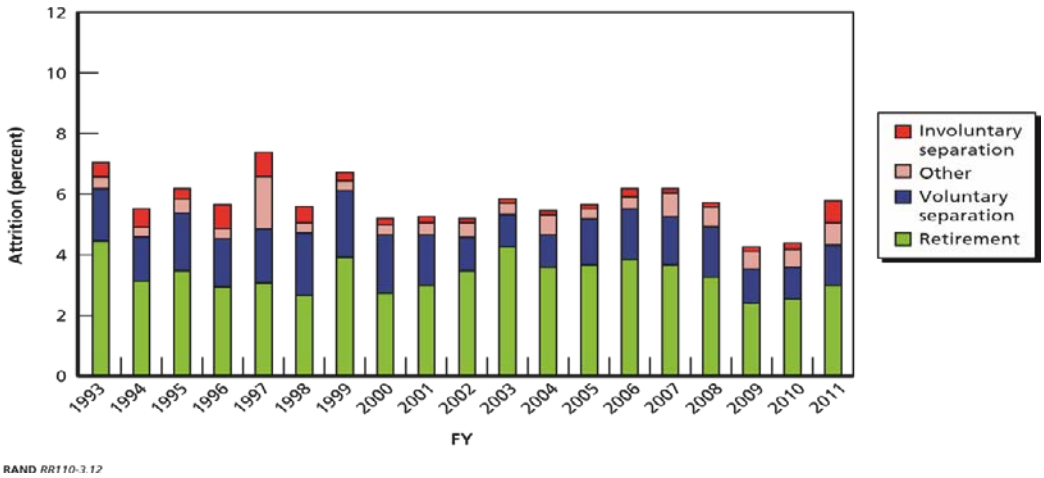

Figure 2. AW Civilian Workforce Attrition Rate, by Fiscal Year and Category. Source: Gates (2013).

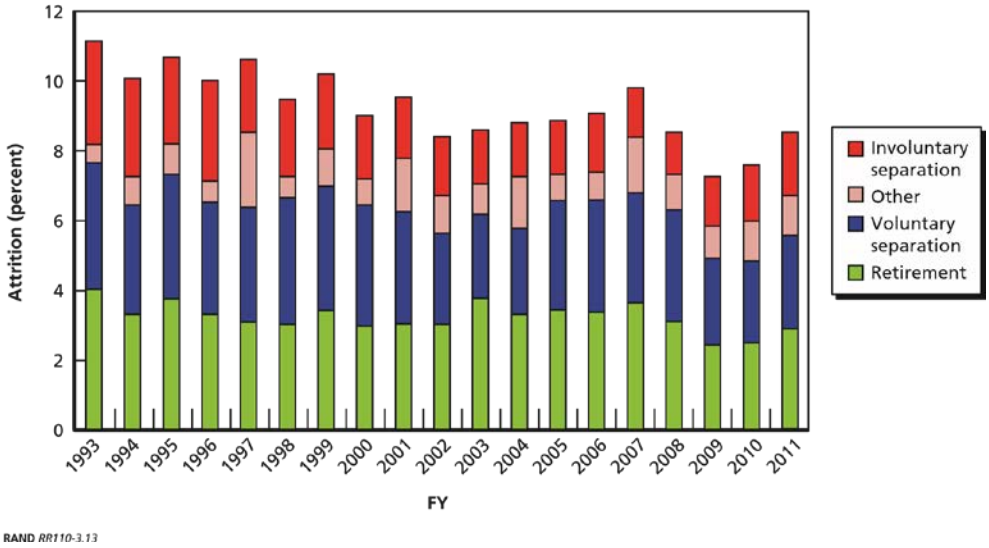

Figure 3. DoD Civilian Workforce Attrition Rate, by Fiscal Year and Category. Source: Gates (2013).

Finally, the RAND institute conducted its most recent research which covers the AWF through FY17. During this time, the AWF greatly increased in size; even during times when other DoD civilian groups were downsizing. This also speaks to the overall importance of acquisition personnel. From FY 2006 to FY 2017, the AWF grew by more than 30 percent (Garcia et al., 2018). Figure 4 shows the total number of AWF employees against DoD workforce employees from 2006–2017.

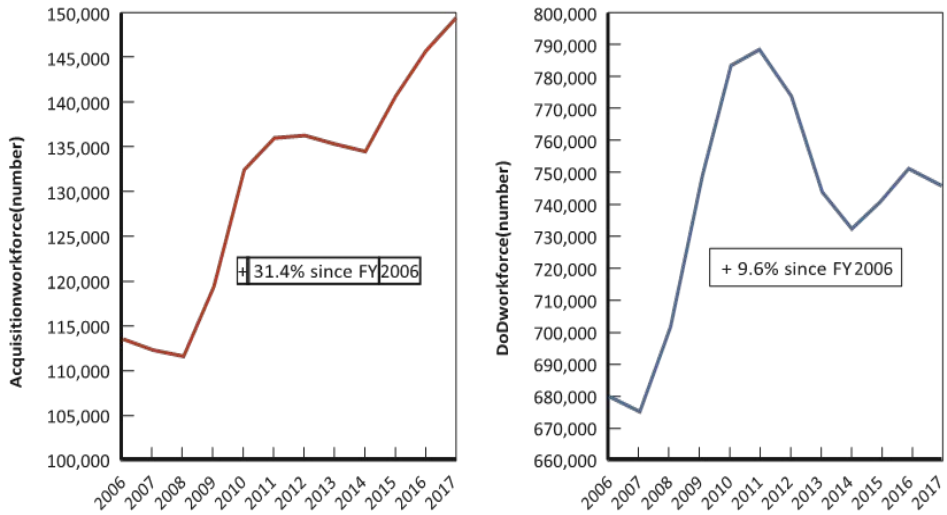

Figure 4. Number of Civilians in the DoD Acquisition Workforce and the DoD Workforce, FYs 2006–2017. Source: Garcia (2018).

Another important element introduced during this research, was the difference between the military acquisition workforce and the civilian AWF. Although the military component is only around 10 percent the size of the civilian AWF, they are more likely to serve in program management roles (Garcia et al., 2018).

C. NPS CIVILIAN ATTRITION RESEARCH

Naval Postgraduate School (NPS) has had students research DoD civilian workforce attrition in the past. In March 2019, Lieutenant Brittany Morgan wrote *Understanding Factors Relating to Attrition of Department of Defense Civilian Employees Using Non-Parametric Survival Methods* (Morgan, 2019). This research examined attrition rates among DoD civilian science, technology, engineering, and mathematics (STEM) employees. Using data from the Defense Manpower Data Center (DMDC), Morgan based her analysis off a cross-section of Army STEM civilians in 2009. She observed that Virginia STEM employees have higher attrition when compared against similar personnel in Texas. Morgan concluded that increases in locality pay for Virginia employees could possibly rectify the issue. She also discovered that there was not any difference in attrition by gender within the STEM community. However, there was a difference in attrition by gender when examining non-STEM related fields (Morgan, 2019).

Also, in March of 2019, Captain Racheal Mwangi published *Department of the Army Civilian Employee Attrition in Calendar Year 2009* (Mwangi, 2019). This research examined the overall attrition for Army civilian employees in 2009. Mwangi's findings were in keeping with the literature that she had previously reviewed, which was attrition rates were higher among young and older federal employees. She also found that years in federal service had a significant factor on attrition, being that employees with more years of federal service had lower attrition rates than those who had less time invested. This shows the trend being that employees will either leave their government position very early on in search of new work, or they will usually stick around until retirement (Mwangi, 2019).

II. JOB SATISFACTION AND ATTRITION

The main purpose of this research is to not simply examine attrition characteristics within the AWF, but to analyze the effects that employee satisfaction has on attrition as well. I am going to analyze an employee's job-life cycle and how job satisfaction, along with environmental factors, impacts job retention behavior. In other words, I am attempting to diagnose reasons why people quit their jobs. According to a study titled *So Hard to Say Goodbye? Turnover Intention among U.S. Federal Employees,* three primary components determine employee turnover: demographic factors, workplace satisfaction factors, and organizational/relational factors (Pitts et al., 2011).

This research concluded that workplace satisfaction was the most significant variable when predicting turnover intention; demographic variables also proved slightly significant, as well as organizational/relational factors (Pitts et al., 2011). It is important to note that due to data limitations, this study analyzes turnover intention instead of actual turnover rates, making the results slightly less significant. The research is also inconclusive about reasons why ethnic/racial minorities decide to leave federal positions. This is because people of color are underrepresented in government jobs, making motivational factors difficult to interrupt (Pitts et al., 2011). Both of these issues are acknowledged by the authors and they request further analysis should be conducted to address them.

Follow-on research conducted in 2016 compared the actual correlation between turnover intention and actual turnover. The study *Does Turnover Intention Matter? Evaluating the Usefulness of Turnover Intention Rate as a Predictor of Actual Turnover Rate* suggests that actual turnover and turnover intention are separate concepts and are predicted using different variables (Cohen et al., 2016). Cohen describes this by stating, "From a practical perspective, federal managers should be cognizant to the possibility that turnover intention may be a poor proxy for actual turnover and that its use as such is potentially yielding dubious results" (Cohen et al., 2016, p. 255). The authors go on to describe actual turnover as far more measurable in nature. Conversely, turnover intention is subjective and much harder to find correlation with. This will certainly be a considered factor during our research because it could be a form of confirmation bias when examining

AWF attrition characteristics. What separates my research from this one, is that we will be comparing two different data sets. The attrition data examined will only be actual turnover, showcasing the differences among demographics. The employee satisfaction data is a separate collection entirely, and free from any biases that might be associated with employee exit interviews regarding the reason for leaving a position. Having said that, the only way we will be able to tie the attrition data to the satisfaction surveys is by command and not at the individual level.

The idea that turnover intention does not accurately represent actual turnover is once again reinforced in the study *Predicting Organizational Actual Turnover Rates in the U.S. Federal Government.* Table 1 clearly shows that intention hypotheses do not always match up when examining actual turnover.

Table 1. Actual versus Intention Turnover Rates. Adapted from Jung (2010).

	Actual Turnover Rate		Turnover Intention Rate	
	Standardized Coefficients	Standard Error	Standardized Coefficients	Standard Error
Main variables Goal ambiguity	0.209	0.264	0.210	0.039
Pay satisfaction	0.216	0.150	0.029	0.022
Interpersonal relationship	0.043	0.072	0.310	0.011
Merit promotion	0.167	0.183	0.246	0.027
Diversity policy	0.211	0.125	0.019	0.019
Workload satisfaction	0.044	0.148	0.162	0.022
Benefit satisfaction	0.017	0.233	0.057	0.035
Control variables Organizational size	0.088	0.018	0.396	0.003
Minority rates	0.140	0.224	0.017	0.033
Female rates	0.001	0.218	0.045	0.033
Constant	(1.116)	1.622	(0.324)	0.243
R_2	0.227		0.347	
Adjusted R^2	0.181		0.307	
F value	4.86		8.75	

Note. Sample size¼176. p<.10; p<.05; p<.01; p<.001.

Jung (2010) goes on to describe the relationship between actual and intention turnover by stating, “Showing insignificant or weak relationships, the correlation results suggest that we reject the ideas that public employees’ intent to leave their organization reflects their actual turnover, and thus that for actual turnover we cannot simply rely on the results of the existing empirical studies on turnover intention” (p. 311). He also goes on to describe the reason for this error in detail and labeling it “ecological fallacy” (p. 311). This is what can happen when organizational-level turnover data is used to predict results for individual level analysis (Jung, 2010).

The research I will conduct will continue to build off the in-depth analysis of civilian attrition within the Department of Defense described in Brien (2019) and Buttrey et al. (2019). As stated before, this study will focus on the AWF’s attrition and the effects of employee satisfaction surveys. We are going examine the different forms of attrition among different demographics within the AWF. It is always the goal of any workforce to have healthy attrition levels that create a low-risk level. Figure 5 gives an excellent example of a DoD civilian’s employment life cycle and its characteristics.

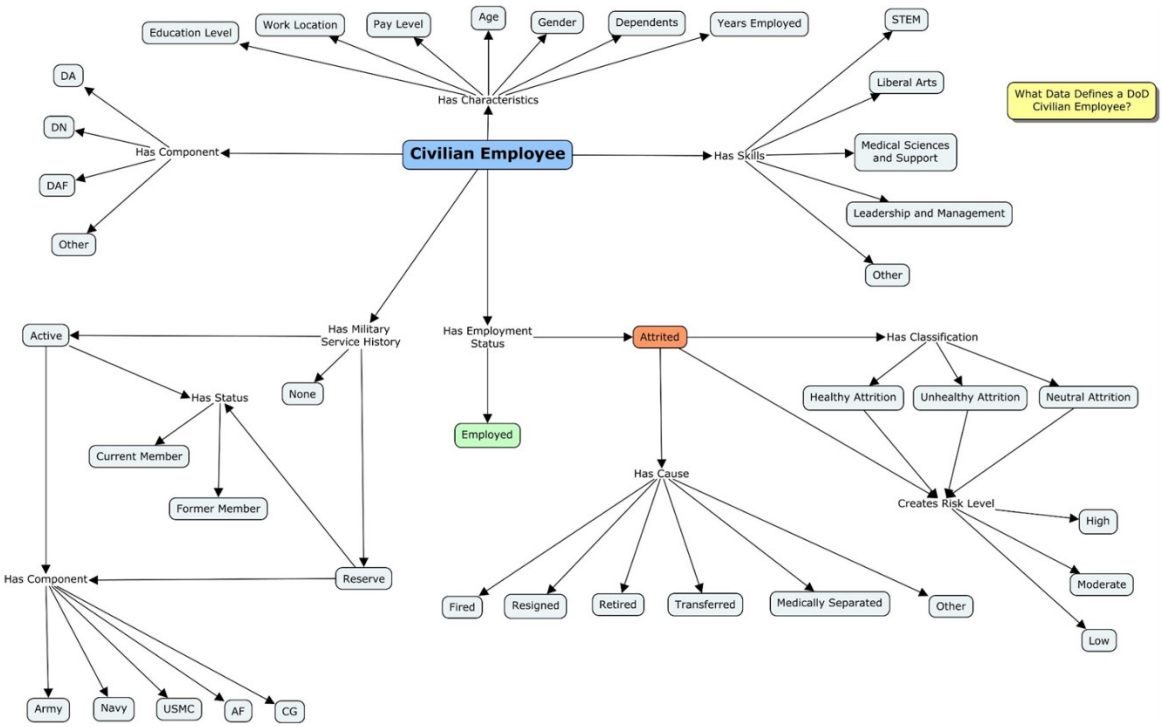

Figure 5. Civilian Employee Concept Map. Source: Buttrey et al. (2019).

III. DATA AND METHODOLOGY

A. EMPLOYEE SATISFACTION DATA

The employee satisfaction data is from the Department of the Navy's Director, Acquisition Career Management (DACM) and was collected in 2018. The data was later emailed to me for the purpose of analysis by Dr. Spencer Brien. (S. Brien, email to author, December 4, 2019) It consists of 672 observations from across 13 different commands. The survey is made up of 113 quantitative questions that make up 11 distinct employment satisfaction criteria. There are several problems with this data that created limitations. First, this data contains both military and civilian AWF members, and civilian surveys are underrepresented. The 11 employment satisfaction survey averages will be made up of both civilian and military responses. Another issue I came across was the fact that not every candidate finished the survey. To counter this, I only analyzed observations that fully completed the survey and were assigned to one of the 13 designated commands, people that were assigned to the OTHER command variable were dropped from observation. Finally, there were a small amount of questions that requested qualitative answers instead of a quantitative scale value. These responses were omitted as well. After these steps were taken, I arrived at the numbers of 672 observations and 113 questions. The following figure is a depiction of the total number of observations broken down by command and gender.

Table 2. Survey Observations by Command.

Observations by Command and Gender	Code	Male	Female	Total
NAVAIR (Naval Air Systems Command)	1	46	79	125
NAVSEA (Naval Sea Systems Command)	2	66	73	139
NAVSUP (Naval Supply Systems Command)	3	74	68	142
SPAWAR (Space and Naval Warfare Systems Command)	4	14	26	40
MARCORSYSCOM (Marine Corps Systems Command)	5	1	2	3
MSC (Military Sea Lift Command)	6	12	6	18
SSP (Strategic Systems Programs)	7	1	1	2
BUMED (Bureau of Medicine and Surgery)	8	1	0	1
OPNAV (Office of the Chief of Naval Operations)	9	2	4	6
OSBP (Office of Small Business Programs)	10	2	2	4
MARCOR I&L (Marine Corps Instillations and Logistics Command)	11	2	2	4
NAVFAC (Naval Facilities Engineering Command)	12	78	93	171
ONR (Office of Naval Research)	13	8	9	17
TOTAL		**307**	**365**	**672**

The following is a detailed analysis of the 11 employment satisfaction areas.

1. Job Satisfaction

This section is comprised seven questions that relate to an employee's satisfaction with general job characteristics. The variable used in the group is **JobSatAverage** and is on a scale 1–7, with 7 being the most satisfied.

2. Supervisor-Related Commitment

This section is comprised of nine questions that strictly ask about the employee's relationship with their supervisor. The variable used in the group is **SupComAverage** and is on a scale of 1–7, with 7 being the most agreeable.

3. Job Characteristics

This section is comprised of four questions that ask about detailed analysis of job assignments and projects. The variable used in this group is **JobChaAverage** and is on a scale of 1–7, with 7 being the most agreeable.

4. Job Role Ambiguity

This section is comprised of nine questions that deal with how well an employee knows how to do their job. The variable used in this group is **JobRoleAverage** and is on a scale of 1–7, with 7 being the most certain and confident.

5. Job Stress

This section is comprised of 17 questions that ask about how job characteristics cause an employee stress in different areas of life. The variable used in this group is **JobStressAverage** and is on a scale of 1–7, with 7 causing the most stress.

6. Commute Strain/Commute Safety

This section is composed of 16 questions, the first three dealing with the strain of an employee's daily commute, the last 13 ask about the safety of the route taken. The variable used is **CommStSafAverage** and is on a scale of 1–7. The higher number represents agreement with negative connotation.

7. Work Family Conflict

This section is comprised of eight questions dealing with how the employee's job affects their family life. The variable used is **WKFMConflictAverage** and is on a scale of 1–5, with 5 meaning negative connotation.

8. Organizational Justice

This section is comprised of six questions dealing with how fair employees are treated within their job. The variable used is **OrgJusticeAverage** and is on a scale of 1–4, with 4 having a positive connotation.

9. Job Fit

This section is comprised of five questions consisting of how well an employee feels they are in the right position. The variable used is **JobFitAverage** and is on a scale of 1–5, with 5 having a positive connotation.

10. Workplace Values

This section is comprised of 12 questions that examine the overall culture and command climate of the workplace. The variable used is **WkPlaceValuAverage** and is on a scale of 1–7, with 7 having a positive connotation.

11. High Quality Relationships

This section consists of 20 questions that deal with the relationships an employee has in the workplace. The variable used is **HQCExperiencesAverages** and is on a scale of 1–7, 7 being positive.

All these employment satisfaction areas were carefully selected from previous and extensive research. The book titled *Taking the Measure of Work: A guide to Validated Scales for Organizational Research and Diagnosis,* by Dail L. Fields, used to generate the survey questions.

B. ATTRITION DATA

The actual attrition data comes from the Department of the Army's Person-Event Data Environment (PDE) and consists of 105,940 observations and 102 different variables. Using this data, I will be examining the attrition characteristics among acquisition civilian employees during 2014. I will not only be analyzing the probabilities of attrition among different demographics but also looking at the different types of separation. Here is a list of the different demographics with their respective variables this study we will be conducting attrition analysis on.

1. Years of Federal Service

This variable **yos** explains the total amount of years in federal service among the observations, with .085 being the least time served and 56.835 being the most.

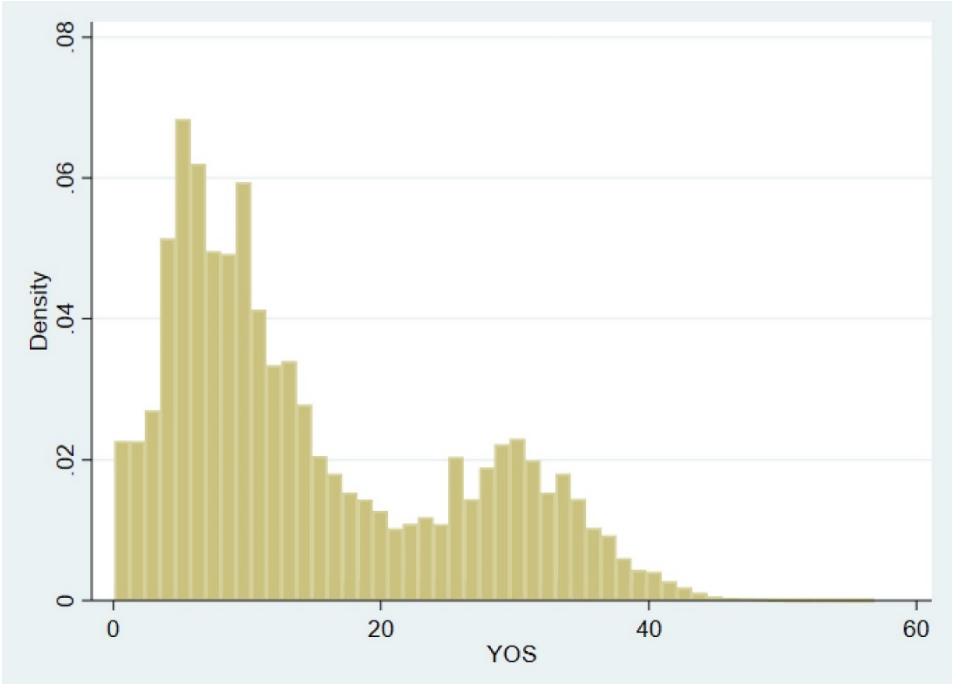

Figure 6. Years of Service Graph.

2. Age

The age variable **age2014** will show the age of the employees at 2014, with 18 being the youngest and 92 being the oldest employee.

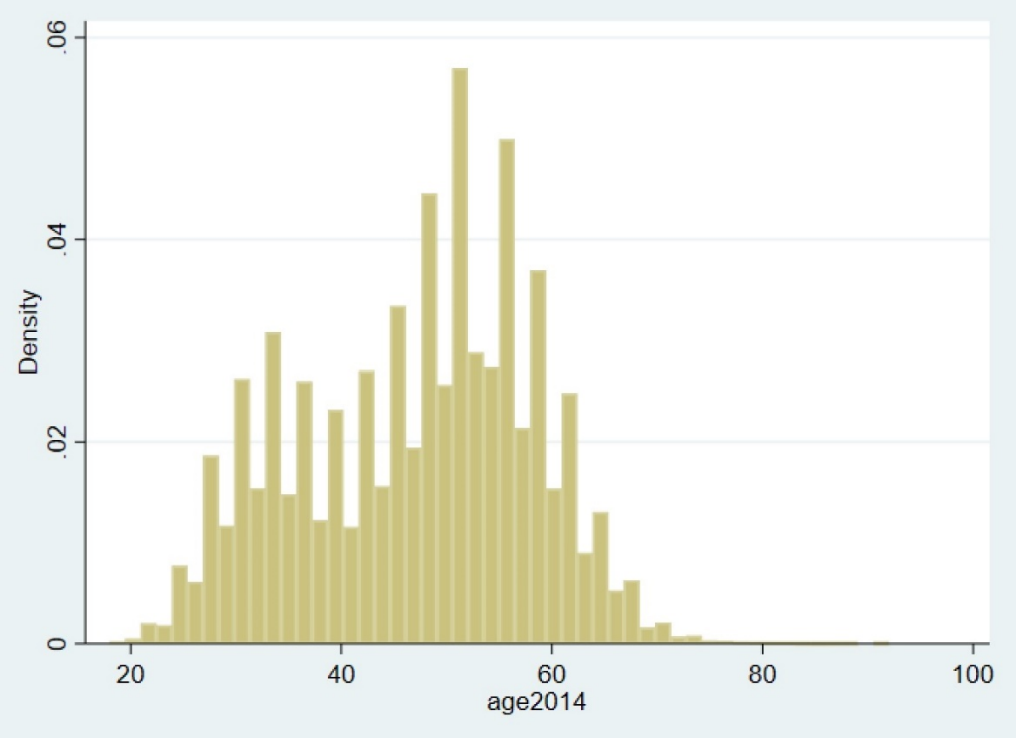

Figure 7. Age at 2014 Graph.

3. Education Level

Education level breaks down the observations into four distinct education groups. Employees with less than high school (**lesshs**), undergraduate (**coll**), and graduate (**grad**) education are held constant, while being compared the baseline variable, which is high school graduate (**hs**).

Table 3. Education Level Breakdown of Observations.

Education Level	Frequency	Percent	Cumulative
<HS	420	0.40	0.40
HS	31,778	30.39	30.39
Coll	52,276	79.74	79.74
Grad	21,466	100.00	100.00
Total	105,940	100.00	

4. GS Rank

This variable **grade** will explain the breakdown of GS employees only, from GS-2 to GS-14. It is important to note that due to the DoD pay banding experiment in 2014, both GS-14 and GS-15 employees are represented under the GS-14 annotation. Also, GS employees make up 83.44 percent of the total number of observations.

Table 4. Distribution by GS Rank.

Grade	Frequency	Percent	Cumulative
GS-2	271	0.31	0.31
GS-3	1,342	1.52	1.82
GS-4	5,024	5.68	7.51
GS-5	8,411	9.51	17.02
GS-6	5,320	6.02	23.04
GS-7	17,520	19.82	42.86
GS-8	559	0.63	43.49

Grade	Frequency	Percent	Cumulative
GS-9	10,418	11.79	55.28
GS-10	170	0.19	55.47
GS-11	13,014	14.72	70.19
GS-12	14,375	16.26	86.45
GS-13	6,583	7.45	93.90
GS-14	5,391	6.10	100.00
Total	88,398	100.00	

5. Gender

The variable **sex1** will annotate the difference in the number of men and women observations.

Table 5. Distribution of Males versus Females.

Gender	Frequency	Percent	Cumulative
Male	61,579	58.13	58.13
Female	44,361	41.87	100.00
Total	105,940	100.00	

6. Command

Command will offer analysis of 11 of the 13 DACM commands in the PDE data; allowing me to compare attrition results with the employee satisfaction survey responses.

The variables used to represent the different commands are as follow: **bumed/marcor/msc/navair/navfac/navsea/navsup/onr/opnav/spawar/ssp**.

Table 6. Breakdown of Observations by Command.

Command	Frequency	Percent	Cumulative
BUMED	4	0.04	0.04
MARCOR	1,862	20.54	20.59
MSC	34	0.38	20.96
NAVAIR	1,470	16.22	37.18
NAVFAC	1,019	11.24	48.42
NAVSEA	2,215	24.44	72.86
NAVSUP	1,842	20.32	93.18
ONR	39	0.43	93.61
OPNAV	6	0.07	93.68
SPAWAR	527	5.81	99.49
SSP	46	0.51	100.00
Total	9,064	100.00	

7. Separation Type

The variable **lasttrdetail** explains all the different types of separation that took place within the AWF during 2014.

Table 7. Distribution of Types of Separation in 2014.

Separation Type	Frequency	Percent
Death	457	2.79
Removal	376	2.30
Resignation	3,562	21.77
Resignation--Involuntary	23	0.14
Retirement--Disability	395	2.41
Retirement--Involuntary	85	0.52
Retirement--Mandatory	1	0.01
Retirement--Special Option	30	0.18
Retirement--Voluntary	7,675	46.91
Separation--RIF	12	0.07
Separation--US	71	0.43
Termination	916	5.60
Termination--Trial Period	87	0.53
Termination--Appointed	2,210	13.51
Termination--Expiration	415	2.54
Termination--Relocation	46	0.28

As we can see, voluntary retirement, resignation, and termination while appointed in the position, make up most of the separation, which is not unusual. Even though termination and retirement will be considered during this research, the primary analysis will be on resignation. This will give us the truest representation of attrition due to job satisfaction. I acknowledge that voluntary retirement could also be caused by

dissatisfaction with the current job as well but not to the same extent. One could also make the argument that an employee can purposefully get themselves terminated due to a lack of job satisfaction, however this does seem unlikely due to the act causing possible future employment issues. That is why I have designated voluntary resignation attrition as being the most closely tied to employment satisfaction. I then created a new variable labeled **resign** in order to capture this action specifically.

C. METHODOLOGY

During the analysis section of this research, I will begin by examining the PDE voluntary resignation rates of the different demographics listed. This will be done by running regression analysis on the computer program STATA 16. In doing so, I will be conducting a logit, odds ratio regression on "resignation" with regard to years of federal service, age, education level, GS rank, and gender. The odds ratio estimates can be interpreted as the marginal effect of a one unit change in employee economic and demographic characteristics on odds of voluntarily resigning from civil service. I will also analyze the results of five interaction variables which will be demonstrating the specific effect that gender has on years of service, age, GS rank, college, and graduate education. This will help develop insights into the relationship between employee characteristics and resignation rates among civilian employees in the acquisition's workforce.

The next step in this process will be to compile the group averages, by command, of the eleven DACM employee satisfaction responses. Allowing me to see how employees within each of the 13 commands feel about their job. I will then analyze the odds of resignation within the 11 PDE commands. The purpose of this will be to compare the command resignation rates against the command's survey responses; to see if there is any trend or correlation between the two.

The odds ratio analysis will demonstrate the chances of resignation for each variable, holding all others constant. With regards to year of service, age, and rank, the effect will show the odds of resignation for every single increase in year or GS rank. When examining education level, high school graduate will be omitted and used as the baseline. The odds of resignation when examining less than high school, college, and graduate, will

all be compared to those employees with high school education only. With regards to the different commands, NAVSEA was omitted and used as the baseline because it had the largest number of observations. When examining the results of the odd ratios' coefficients, any number less than one will demonstrate lower odds of resignation; a coefficient greater than one will show higher odds of resignation, holding everything else constant.

IV. ANALYSIS

A. LOGIT REGRESSION OF VOLUNTARY RESIGNATION

The following table is a detailed analysis of voluntary resignation using logit regression. It also demonstrates the effects in terms of odds ratios.

Table 8. Logit Regression of Voluntary Resignation

Logistic regression	Observations = 88,336
	LR chi2(18) = 1607.44
	Prob > chi2 = 0.0000
Log likelihood = -12339.1294	Pseudo R2 = 0.0612
Dependent Variable: resign	
Results are converted	

resign	**Odds Ratio**	**Std. Err.**	**z**	**P>|z|**
Years of Service **[yos]**	0.949	0.004	-13.33	0.000***
Age at 2014 **[age2014]**	0.971	0.003	-11.31	0.000***
GS Rank **[grade]**	0.987	0.009	-1.48	0.138
Less than High School **[lesshs]**	1.790	0.491	2.12	0.034**
College **[coll]**	0.696	0.041	-6.19	0.000***
Masters **[grad]**	0.741	0.050	-4.42	0.000***
Female **[sex1]**	1.112	0.185	0.64	0.522
Yos*Sex1 **[yos_sex1]**	0.985	0.006	-2.52	0.012**
Age2014*Sex1 **[age2014_sex1]**	1.002	0.004	0.38	0.703
Grade*Sex1 **[grade_sex1]**	1.005	0.013	0.41	0.685
Coll*Sex1 **[coll_sex1]**	0.959	0.085	-0.47	0.635
Grad*Sex1 **[grad_sex1]**	0.727	0.078	-2.98	0.003***
NAVAIR **[navair]**	0.726	0.141	-1.65	0.099*

resign	Odds Ratio	Std. Err.	z	P>|z|
NAVSUP **[navsup]**	0.765	0.120	-1.70	0.089*
SPAWAR **[spawar]**	0.460	0.329	-1.09	0.278
MARCOR **[marcor]**	1.249	0.171	1.62	0.104
MSC **[msc]**	1	(omitted)		
SSP **[ssp]**	0.840	0.857	-0.17	0.865
BUMED **[bumed]**	1	(omitted)		
OPNAV **[opnav]**	1	(omitted)		
NAVFAC **[navfac]**	0.642	0.150	-1.89	0.059*
ONR **[onr]**	1	(omitted)		
_cons	0.330	0.036	-10.12	0.000

Note 1: _cons estimate baseline odds.
Note 2: *** annotates statistical significance at the 0.01 P>|z| level.
Note 3: ** annotates statistical significance at the 0.05 P>|z| level.
Note 4: * annotates statistical significance at the 0.10 P>|z| level.

1. Years of Federal Service

When examining the effect that years of federal service have on resignation attrition, I found that the odds of resigning decrease as an employee accumulates time in service. For every additional year of accredited federal service, the odds of resignation decrease by 5 percentage points, holding everything else constant. This coefficient is also statistically significant at the 0.01 level. This is consistent with previous research, and it makes sense that an employee is less likely to leave a position as they get closer to acquiring a government pension. I also found when examining the interaction between years of service and gender, that for year of additional federal service, the odds of females resigning decreases by 6.5 percentages points. This is also statistically significant at the 0.05 level. In other words, women are slightly less likely to resign than men as years in federal service

increases. Figure 8 is a visual representation of the marginal effects that years of service has on resignation.

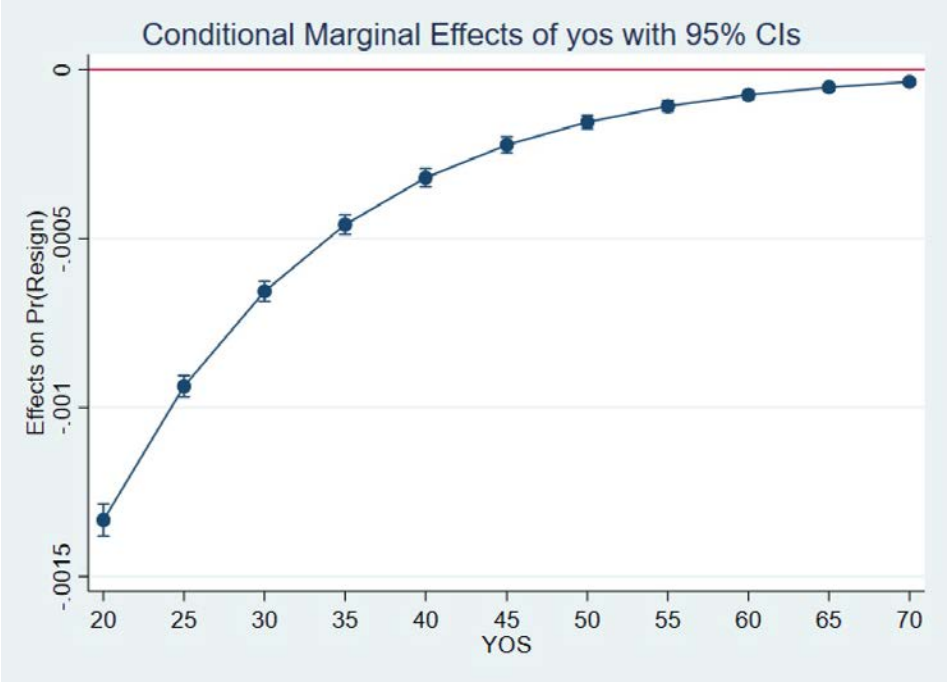

Figure 8. Marginal Effects —Years of Service on Resignation.

2. Age

I noticed a similar effect with regards to age. For every one-year increase in age, the odds of an employee resigning decrease by 3 percentage points. This coefficient is also statistically significant at the 0.01 level and is consistent with previous research. However, when analyzing the interaction between age and gender there is no statistical significance. The below figure is a visual representation of the marginal effects that age has on resignation.

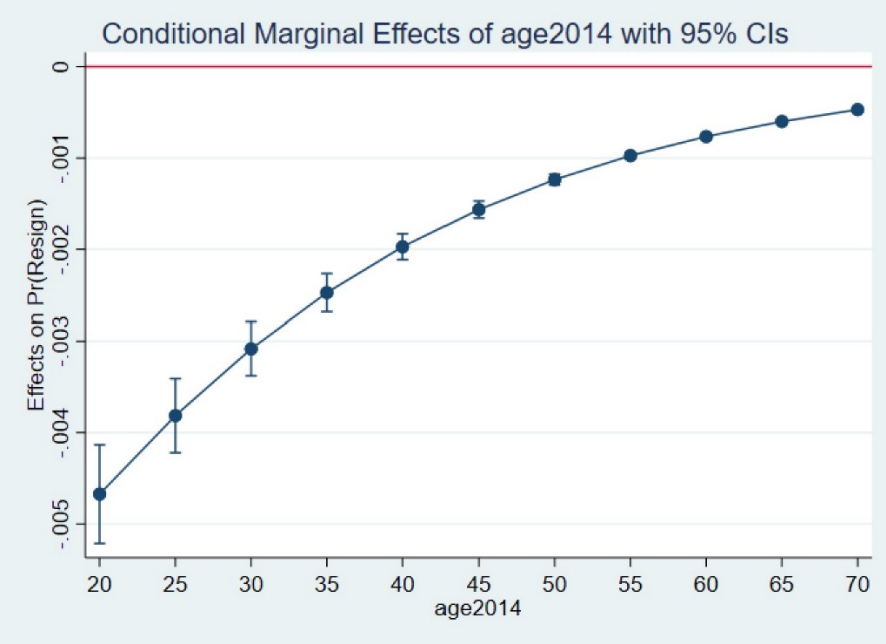

Figure 9. Marginal Effects—Age on Resignation.

3. Education Level

When examining education level, employees with high school education were omitted and used as our base for comparison. Indicator variables identifying education levels of less than high school, college, and graduate education were included in the model. When compared to high school graduates, the odds of an employee with less than high school resigning increases by 79 percentages points. This estimate was statistically significant at the 0.05 level. Both coefficient estimates of the effect of college and graduate education prove to be statistically significant at the 0.01 level. When compared to high school graduates, the odds of a college graduate resigning decreases by 30 percentage points and the odds of an employee with a graduate degree decreases by 26 percentages points.

The model includes an interaction between sex and graduate education to determine whether women experience a differential effect of graduate education. This means that the interpretation of the odds ratios for the education variables are the base effect for men. The interaction terms test whether there is a statistically significant difference in the effect of

education for women. If the interaction terms are insignificant, then there is no difference and the base effect applies to men and women, otherwise the interaction represents the differential effect that should be added to the base effect. The interaction between being female and having a master's degree was estimated to be statistically significant at the 0.01 level. Using the lincom command in STATA to calculate the aggregate linear combination of the base effect and the interaction term reveals that for women with graduate degrees, the odds of voluntarily resigning decreases by 53 percentage points when compared against a male with only a high school education. This is nearly double the reduction in the odds of resignation for men with graduate degrees.

It is interesting to note that originally an increase in education from high school to undergraduate, drastically decreases the odds of resignation. However, that same effect is slightly less for employees with graduate level education. This could be due to an inverse effect; being that a master's degree possibly opens the door for more lucrative employment opportunities. The following figure is a visual representation of the marginal effects that education level has on resignation.

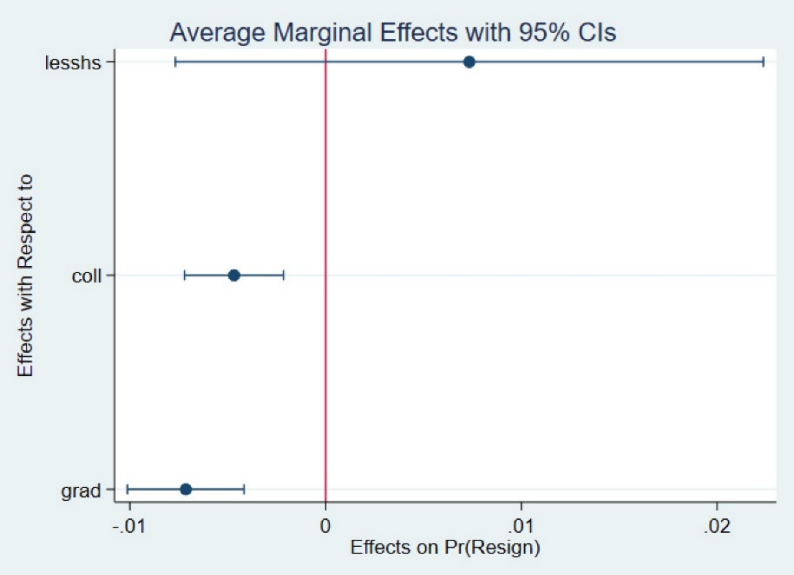

Figure 10. Marginal Effects—Education Level on Resignation.

4. GS Rank

Regarding GS Grade, the estimates indicate that a one unit increase in grade on the GS scale, the odds of an employee resigning slightly decreases but the coefficient is not statistically significant. The interactive variable examining singular rank increase with gender is also not statistically significant.

5. Gender

When attempting to predict the odds of resignation between men and women, there was no statistical significance to be found. There was also no statistical significance on the odds of resignation when examining the interaction between having a college education and being female. While sex does not appear to have any effect on voluntary separation on its own, sex does appear to mediate the separation effects of years of service and education, as discussed in the previous sections.

B. COMMAND RESIGNATION RATES COMPARED WITH EMPLOYEE SATISFACTION RESPONSES

1. Command

There were several steps taken when conducting the analysis of command resignation attrition and command employee satisfaction responses. First, I conducted the logit odds ratio regression on 11 of the 13 matching commands within the PDE data. These logit estimates are reported on Table 8 with the other logit results. Unfortunately, due to a lack of observations, MSC, BUMED, OPNAV and ONR had to be omitted from the analysis. Then NAVSEA was omitted and used the baseline for comparison because it had the largest number of observations. After running the regression, I found that only NAVAIR, NAVSUP, and NAVFAC were statistically significant, all at the 0.10 level. The odds of a NAVAIR employee resigning when compared against a NAVSEA employee, decreased by 27 percentage points, NAVSUP decreased by 23 percentage points, and NAVFAC decreased by 36 percentage points, everything else being held constant. The below figure is a visual representation of the marginal effects of other command resignation rates compared against NAVSEA.

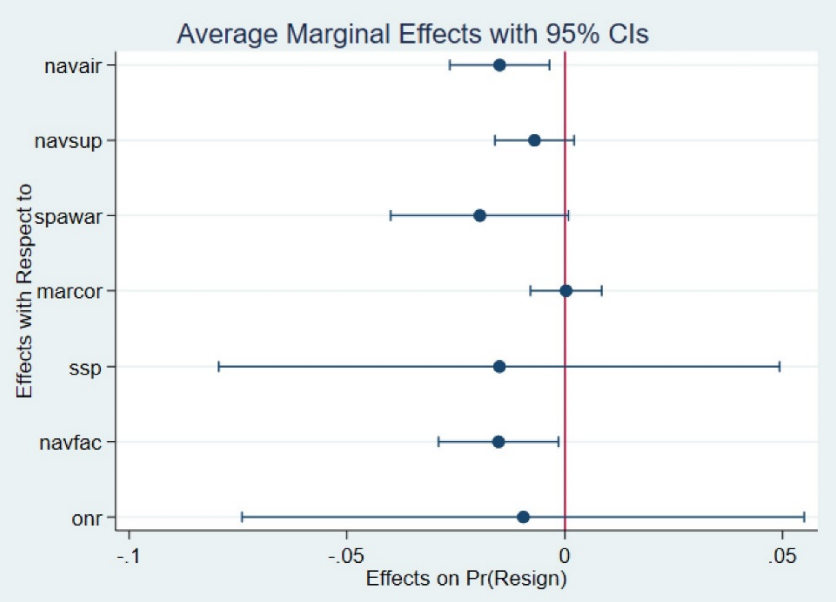

Figure 11. Marginal Effects—Command Resignation Rates Compared against NAVSEA.

2. Employee Satisfaction Survey Results

When examining the results of the employee satisfaction surveys, only the commands that proved to be statistically significant within the PDE logit, odds ratio regression were taken into consideration. That being case, only NAVAIR, NAVSUP, and NAVFAC were compared against the omitted command which was NAVSEA. All three of these commands had lower odds of resignation when compared against NAVSEA. However, NAVSEA had more positive averages than these three commands throughout much of the survey. There were only three satisfaction areas in which NAVSEA seemed to be consistently outperformed by the other three commands. These group averages were **Job Stress, Commute Strain/Safety,** and **Organizational Justice.** With regards to job stress, two out of the three commands had more successful responses than NAVSEA, only NAVFAC performed worse in this area. When analyzing the results of commute strain/safety and organizational justice, all three commands performed better than NAVSEA. This does not necessarily prove causation, but it does provide an interesting analysis. If ignoring statistical significance for a moment, a case can be made for the importance of **Work Family Conflict.** MARCOR was the only command that had higher

odds of resignation when compared to NAVSEA. Even though they performed well in some areas, their work family conflict average scored by far the worst of any command. It also proved to be the largest gap in any one single category between the bottom two scores. The following table demonstrates the 11 group employee satisfaction averages by command. NAVSEA is highlighted in blue as the omitted base variable and the statistically significant commands are highlighted in green.

Table 9. Employee Satisfaction Averages by Command.

Command	JobSatAve	SupCom	JobChaAve	JobRoleAve
NAVAIR	5.075	4.255	5.051	5.642
NAVSEA	5.135	4.446	5.007	5.545
NAVSUP	5.021	4.213	4.833	5.521
SPAWAR	5.420	4.541	5.294	5.921
MARCOR	4.333	3.658	5.667	6.556
SSP	4.857	4.125	4.500	6.000
NAVFAC	4.864	4.381	4.803	5.769

Command	JobStressAve	CommStSafAve	WKFMConflictAve	OrgJusticeAve
NAVAIR	2.688	2.477	3.779	3.372
NAVSEA	2.889	2.983	3.685	3.255
NAVSUP	2.670	2.700	3.287	3.300
SPAWAR	2.503	2.979	3.569	3.325
MARCOR	2.797	2.080	5.500	3.333
SSP	2.890	1.676	3.625	3.333
NAVFAC	2.937	2.702	4.057	3.284

Command	JobFitAver	WkPlaceValuAve	HQCExperiencesAve
NAVAIR	3.532	4.599	5.257
NAVSEA	3.667	4.632	5.359
NAVSUP	3.624	4.562	5.485
SPAWAR	3.955	4.865	5.439
MARCOR	3.867	4.278	5.238
SSP	4.200	5.292	6.000
NAVFAC	3.713	4.193	5.301

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V. CONCLUSION

A. SUMMARY OF RESULTS

The results of this research provide several statistically significant characteristics regarding voluntary resignation trends within the DoD's Civilian AWF. As an employee increases in age and accumulates more years in federal service, the odds of them choosing to resign from their given position will decrease. The odds of an employee resigning decrease with more education. Although there is a slight reversal in this trend upon the obtainment of graduate education, the general correlation remains true. When compared against men, the odds of women resigning decreases as years of service accumulates. The odds of resignation among women with graduate education drastically decreases when compared against men with only high school. Additionally, women with graduate degrees experience a larger retention effect than men with graduate degree.

When analyzing command attrition with the results of employee satisfaction surveys, I found less correlation due to the lack of statistical significance. However, the results suggest that of all the job satisfaction components, the most highly associated with retention are job stress, commute strain/safety, organizational justice, and work family conflicts. Future research on employee separation should focus on these factors and their relationship with turnover.

B. LIMITATIONS

There were far fewer data limitations when examining the resignation characteristics of different demographics than there were with the command analyses. The PDE provided a plethora of observations and data regarding individual variables. Because of this, I was able to produce statistically significant correlation between resignation trends and certain demographic variables. However, since the DACM employee satisfaction data was separate from the PDE attrition data, it was incredibly difficult to merge the analysis. Only 11 of the 13 commands were represented in both sets of data, with another four having to be omitted because of a lack of representation within the PDE. Then the analysis was further limited to only three commands due to statistical insignificance. The fact that the

DACM and PDE data were not collected during the same years also contributed to ambiguity. In future research, it would be incredibly helpful to have employee satisfaction survey responses incorporated into the PDE attrition data. In doing so, employee attrition can be directly linked to satisfaction responses on an induvial level. Being able to match the survey responses to an observations ID number would be far more concise than examining attrition at the command level. Another always present issue with this research would be human error and data collection mistakes. One can never be certain that all the information collected is fully accurate, especially when trying to cross examine two separate data sources. The issue of survey response bias may also lead to problems with this research. An employee may have ulterior motives for responding to questions in a certain way or may simply not feel like taking the survey that day. All these factors could be present during this research that may affect the results.

C. RECOMMENDATIONS

1. Commands that have AWF civilians should be aware that employees with more years of federal service and are older, are less likely to voluntarily resign. However, rank seniority is not necessarily a factor when predicting resignation attrition.

2. Employers should attempt to hire AWF civilians with higher levels of education. Employees who are more educated, tend to resign at lower rates.

3. When attempting to develop a prosperous command climate or work atmosphere, leadership should do their best to accommodate issues with job stress, commute strain/safety, organizational justice, and work family conflicts.

4. Recommend the merger of employment satisfaction survey responses into the PDE database and conduct future analysis on the AWF resignation attrition rates. Correlation between satisfaction survey responses and resignation could be possible but further analysis is needed to verify.

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